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Biotechnology Notes

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Biotechnology Notes, a compilation of agency activities, news events, and upcoming meetings, is prepared for members of the U.S. Department of Agriculture's (USDA) Committee on Biotechnology in Agriculture (CBA) by USDA's Office of Agricultural Biotechnology (OAB).

INSIDE USDA

BARLEY: MAKING GOOD EVEN BETTER

Barley is one of those grains people seem to be re-discovering for the first time. Like oats, it's thought to lower cholesterol and provide a good source of energy. So good, in fact, some Japanese add barley to their rice bowls for added nutritional value. But although scientists know barley is good for you and for livestock as well, a lot still remains unknown. That is why 26 scientists in the United States and 23 in Canada began mapping the barley genome.

The project is in its fourth year and is spearheaded by Robert Nilan at Washington State University's College of Agriculture and Home Economics. It is partly funded by USDA's Cooperative State Research Service. The goal is to identify those genes in barley that control important economic traits.

The scientists have developed a 200-molecular marker map that allows them to identify the genes. One trait in particular, nutritional quality, is very important to farmers because most barley (75%) is used for livestock feed. Other significant traits being analyzed include those which control yield, adaptation, disease reaction, straw height and strength, and maturity. In addition, the team is studying those genes that control malting quality, a trait important to the distilling industry.

Knowledge gleaned from these studies will be passed on to breeders through technology transfer centers located in the United States and Canada. Anyone wishing to learn more about the barley genome mapping project may call Robert Nilan at 509-335-3661.

ABRAC MEETING DATES CHANGED

The February 19-21 meeting of USDA's Agricultural Biotechnology Research Advisory Committee (ABRAC) has been cancelled and is tentatively rescheduled for March 11-13 at the Rosslyn Westpark Hotel, Rosslyn, Va., pending completion of the confirmation process

for new members and reappointees who would serve two-year terms. To confirm meeting dates, please call the Office of Agricultural Biotechnology (OAB) at 703-235-4419; FAX: 703-235-4429.

BT: HARD TO RESIST

Bacillus thuringiensis (Bt) is a bacterium that was first discovered in 1911. Later it became apparent that Bt produces a protein that is toxic to insects. Bt became commercially available as an insecticidal spray in the 1950's and by the 1980's scientists found they could use genetic engineering to clone the genes that impart insect resistance and then move these same genes into crops that were particularly vulnerable to insect pests.

Scientists have recently noticed that those bugs that were previously killed now continue to munch away because the insects have developed resistance to the Bt protein. This raises the continuing challenge of how to prolong the usefulness of products that protect crops against pest damage.

The scientific community has met several times to discuss the problem and develop possible strategies for combatting insect resistance. The latest conference took place January 22-23 at USDA and the group's recommendations should be finalized in several weeks. Anyone wishing to receive a copy of the report may call 202-401-4892 after February 15.

DISNEYWORLD REP AT COUNCIL MEETING

Last month's meeting of USDA's Biotechnology Council featured Alexandra McKently as its main speaker. McKently is a plant biotechnology specialist at the Disneyworld/EPCOT Center, Orlando, Florida. McKently gave an overview of the research going on at EPCOT's Land Pavilion including a project to transform the peanut with *Agrobacterium tumefaciens* and another project using tissue culture to save endangered plants. She said the effort to communicate science to the public is serious business as well at the Land Pavilion, and that many resources are devoted to stimulating the public's interest in science, such as multi-media presentations, boat tours, and special tours of greenhouses and field plots.

BIOTECH LECTURE SERIES

The Biotechnology Information Center at USDA's National Agricultural Library (NAL) has scheduled the following series of talks on biotechnology. Each begins at 2:30 p.m. in Room 1400 at NAL in Beltsville, Md. For more details, please call 301-504-5340.

Feb. 12: Biotechnology and Plant Tissue, by John Nelson, McCormick Foods.

March 12: Biotechnology Regulation in the Food Industry, by James Maryanski, Food and Drug Administration.

March 31: Biopesticides and Biotechnology, by Jim Davis, Crop Genetics.

April 9: Transgenic Animals, by Vern Pursel, USDA's Agricultural Research Service.

NEWS AROUND THE NATION (AND THE WORLD)

RISK ASSESSMENT REPORT OUT

A final report is now available on risk assessment projects funded by the European Community's (EC) Biotechnology Action Programme (BAP) from 1985 to 1990. The EC now funds risk assessment research under BRIDGE (Biotechnology Research for Innovation Development and Growth in European Programs).

The BAP report focuses on the release of both genetically modified microorganisms and transgenic plants into the environment. It is written in English and can be ordered by sending a telefax to I. Economidis, DGXII, at 32-223-55-365.

DETECTION METHODS PAPER REVIEWED

Members of the technical working group on biotechnology and the environment, a U.S.-EC collaborative project, met recently to review and discuss a draft paper entitled "Methods for the Detection of Microorganisms in the Environment." The document summarizes techniques currently used for monitoring microorganisms in the environment, such as the use of microscopy, various methods requiring media culturing, and other techniques that label and detect nucleic acids.

The paper is intended as a resource tool for scientists planning to conduct research involving environmental microbiology and for those agencies and individuals responsible for the oversight and safety of such experiments. The paper will be available soon from the National Technical Information Service in Springfield, VA.

CATERPILLARS GET THEIR COMEUPPANCE

If caterpillars were left unchecked, we could all end up wearing polyester suits for the rest of our lives. These insects consume so much cotton that about 80 percent of all insecticides applied to cotton are used to combat this one pest. Losses to cotton producers are estimated to be in the hundreds of millions of dollars each year. Producers of cottonseed oil and livestock feed who use different parts of the cotton plant are affected as well as those who work in the textile industry.

Now, researchers at Monsanto Company, St., Louis, Missouri, have developed transgenic cotton that has built-in insecticide resistance. This could mean a dramatic decrease in the use of chemical pesticides.

The resistance comes from a protein derived from Bt, a common soil microbe. The plants have already been field tested under permits issued by USDA's Animal and Plant Health Inspection Service, and the results show that transgenic plants do in fact protect themselves from caterpillars.

Monsanto now plans to conduct more field tests on half-acre to 20-acre plots in 11 states and has asked the Environmental Protection Agency (EPA) for an experimental use permit. The Monsanto request will be the subject of a meeting of EPA's Scientific Advisory Panel on February 25, and the public is invited to attend.

EPA is now examining its policy for regulating transgenic plants that produce pesticides. Although the agency has the authority to regulate all pesticides, including traditional chemical and microbial ones, policy regarding transgenic plant pesticides has not been developed. For more information about the meeting, please call Bruce Jaeger at 703-305-5369.

MOUSE MILK DISCOVERY

Cystic fibrosis is a lethal disease that affects about 30,000 people in the United States and occurs once in every 2,000 to 3,000 births. Thanks to biotechnology and researchers at Genzyme Corporation, Cambridge, MA, and the Tufts University School of Veterinary Medicine in North Grafton, MA, a new therapy using transgenic mouse milk may be on the way.

In preliminary experiments, researchers developed an expression system in mouse milk for a membrane protein called Cystic Fibrosis Transmembrane Regulator, the protein coded by the gene associated with cystic fibrosis. The discovery means large quantities of the protein can now be made and analyzed for possible therapeutic use.

Last year, Genzyme and Tufts worked on another human pharmaceutical project that used goat milk to produce tissue plasminogen activator (tPA)). tPA is used in the treatment of heart attacks. For more information about this latest discovery, call Cristin Merck at Tufts University at 508-839-7910. The FAX number is 508-839-7232.

CLONES OF HUMAN BRAIN cDNAs ADDED TO CATALOGUE

The 5th edition of the American Type Culture Collection's (ATCC) catalogue of human and mouse DNA probes includes the initial deposits of clones of human brain cDNAs (complementary deoxyribonucleic acids) being sequenced by the laboratory of J. Craig Venter at the National Institutes of Health. More than 2600 human and mouse DNA probes available from ATCC are listed including oligonucleotide primers, oncogene-transforming protein probes and clones, and bacterial hosts for transformation or platings. To order a copy, please call Patrick Burke at 301-231-5524. The FAX number is 301-231-5826.

GOOD READING

The November/December 1991 issue of *Agro-Industry Hi-Tech* features several interesting and well-written articles and research papers on agricultural biotechnology. Topics include the use of Bt in crop protection, a strain of *Streptomyces* that has been developed into a commercial biofungicide, the use of biotechnology in the oil and fat industries, and biotechnology and consumer perceptions. The journal is published by Teknoscienze, Milan, Italy, and editors will consider papers for publication from authors around the world. For more details or to place a subscription, please write to Teknoscienze sri, Via V. Gioberti 1, 20123 Milan, Italy. (Tel: 39-2-4818011; FAX: 39-2-4818070)

IN CASE YOU WEREN'T THERE

"Advances in Gene Technology: Feeding the World in the 21st Century" was the title of this year's Miami Biotechnology Winter Symposium, January 19-24. According to OAB Deputy Director Daniel Jones, one of the notable trends this year was the increasing number of successful genetic transformations of cereal grains. Cereals and other monocots have proven to be difficult to transform with traditional vectors, such as *Agrobacterium tumefaciens*. The speakers reported that maize, rice, and wheat were successfully transformed for herbicide resistance using particle bombardment. Other researchers reported new methods for removing antibiotic resistance genes from transformed organisms, turning male sterility

in plants on and off by manipulating anther-specific genes, and inserting fish antifreeze genes into tobacco plants.

NEW PUBLICATIONS

■ *Advanced Techniques in Chromosome Research*. Edited by Kenneth W. Adolph. Published by Marcel Dekker Inc., New York. 1991. Includes chapter on production of transgenic animals using gamete and embryo micromanipulation. To order write to Marcel Dekker Inc., 270 Madison Ave., New York, NY 10016.

■ "Strategies for Assessing the Safety of Foods Produced by Biotechnology." A report prepared by the World Health Organization (WHO) based on a conference held in Geneva, Switzerland, November 1990. To order write to WHO in Geneva.

■ *Science and Engineering: Research Benefits*. Prepared by the National Science Foundation. To order call 202-357-9498.

■ Two new reports are now available from PJB publishers of Great Britain: "Future Prospects for Veterinary Biotechnology", Reference SR 93, published in September 1991, and "EC Biotechnology Directives," Reference DS 64, published in November 1991. For more details, please contact PharmaBooks Ltd (Tel: 212-262-8230; Fax: 212-262-8234.)

■ "You Don't Have to be a Rocket Scientist" is an inciteful article by John Doble and Amy Richardson in the January 1992 issue of *Technology Review*. The authors show that the public is quite capable of assessing complex scientific issues when given a proper framework that includes options and trade-offs.

The following new books were recently published by CAB International and may be ordered by writing to the University of Arizona Press, 1230 N. Park Ave., Tucson, AZ 85719. The telefax number is 1-602-621-8899:

■ *Advanced Methods in Plant Breeding and Biotechnology* by David R. Murray, editor. \$95.

■ *Barley: Genetics, Molecular Biology and Biotechnology* by P.R. Shewry, editor. \$142.50.

■ *Rice Biotechnology* by G. Khush and G. Toenniessen, editors. \$85.50.

■ *Plant Breeding in the 1990's* by H. T. Stalker, editor. \$104.50.

■ *Appropriate Biotechnology in Small-Scale Agriculture: How to Reorient Research and Development* by J. Bunders and J. Broerse, editors. \$23.75

■ *Biotechnology of Cotton* by J. McD. Stewart. \$33.25.

UPCOMING MEETINGS

Feb. 6-11: The AAAS Annual Meeting. Chicago, Ill. For more information write to AAAS '92, P.O. Box 630285, Baltimore, MD 21263.

Feb. 18-19: Annual Meeting of the Industrial Biotechnology Association. Turnberry Isle, Fla. Call 202-857-0244.

Feb. 20-21: International Patent Protection for Biotechnology Companies. Washington, DC. Call 508-650-4700; Fax: 508-653-1627.

Mar. 11-12: Agro-Industrial and Forestry Research and Technology Days. Brussels, Belgium. Sponsored by the Commission of the European Communities, Directorate General XII. Call 32-2-647-8780. The FAX number is 32-2-640-6697.

Mar. 11-13: Meeting scheduled tentatively for USDA's Agricultural Biotechnology Research Advisory Committee. Rosslyn Westpark Hotel, Rosslyn, VA. Call the OAB for more details at 703-235-4419; Fax: 703-235-4429.

Mar. 23-27: Recombinant DNA: Techniques and Applications. This is a 5-day course that covers the latest rDNA procedures. A basic knowledge of nucleic acids is helpful but not necessary. Sponsored by the American Type Culture Collection. Washington, DC. For more information please call 301-231-5566.

Apr. 10-16: "Crop Improvement via Biotechnology: An International Perspective." Keystone, Colorado. For details please write to Keystone Symposia, P.O. Box 2156, Dillon, CO 86435.

Apr. 23-25: Biotechnology Science and Commercial Applications. Hilton Head Island, SC. Call Barbara Cole at Patent Resources Group Inc. at 202-223-1175.

Apr. 27-28: Tenth Annual ATCC Biotechnology Patent Conference. Washington, DC. Sponsored by the American Type Culture Collection. Please call 301-231-5566 for details.

May 11-14: Second International Symposium on the Biosafety Results of Field Tests of Genetically Modified Plants and Microorganisms. Goslar, Germany. Call the OAB at 703-235-4419; FAX: 703-235-4429.

May 27-29: "Animal Biotechnology: Challenges and Opportunities." College Station, Texas. The meeting is sponsored by the National Agricultural Biotechnology Council. Call 607-254-4859; FAX: 607-255-2428.

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Biotechnology Notes is written by Marti Asner, public affairs specialist in USDA's Office of Agricultural Biotechnology. Suggestions for future issues are always appreciated and may be sent to USDA/OAB, Room 1001, Rosslyn Plaza East, 14th and Independence Ave., S.W., Washington, DC 20250-2200. Phone: 703-235-4419; Fax: 703-235-4429.